



Propagation of Fruit and Nuts by Seed

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Collecting and growing fruit and nuts from seeds can be fun, but in most cases should only be used as rootstock or in breeding programs. Most fruit and nuts will not bear fruits true to a variety when propagated by seeds; however, these seedlings can be used as rootstocks. Budding and grafting to desirable varieties will ensure getting quality fruit. Some seeds may need certain treatments to get them to germinate because they have hard seed coats or are in a dormant state.

In some cases, a hard seed coat may hinder germination. In nature, seed coats are broken down by microbial action in the soil, traveling through the digestive track of a bird or animal, freezing and thawing or fire. Often, one of the following three treatments called scarification will be needed to make the seed coats permeable to water: (1) soaking in sulfuric acid for a short period, (2) soaking in hot water or immersing the seed for a short period in boiling water, or (3) mechanical scarification, such as scratching the seed with a metal file or coarse sandpaper. Scarification is not always needed. Often, the cause of natural delay in seed germination is dormancy of the embryo. A seed with a dormant embryo must complete a process of "after-ripening" before it acquires the ability to germinate. After-ripening takes place only at the proper temperature and in the presence of an abundant supply of moisture and air (oxygen). For most of the native trees and shrubs in Oklahoma, an average temperature of 41 F is favorable for after-ripening.

In practical handling of dormant seed, after-ripening is done by "stratification," i.e. by mixing the seed with moist sand, sawdust, peat moss or vermiculite. Vermiculite is preferable because it is sterile, has good water-holding capacity, and yet while moist (not wet), does not interfere with aeration of the seed. Certain types of seed may benefit from fungicide treatments prior to stratification.

After being thoroughly mixed with the stratification medium, the seed is placed in plastic bags or other sealable containers. The container is stored in a place where the temperature can be controlled. Stratified seed should never be packed tightly because this will interfere with good aeration.

After mixing the seed and stratification medium in the container, it is advisable to put an additional layer (1/2-inch thick) of vermiculite on the top of the mixture. This will help to keep the seed moist throughout the period of stratification. Properly stratified seed kept at a low temperature should remain moist for at least two months to three months. Label bag with the date and whatever details necessary (*seed source, variety, date gathered, etc.*). Occasionally, check the bags to make sure the vermiculite is moist and free of mold.

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Large quantities of stratified seed can be kept in a cooler, cold room or in a cellar. When neither of these is available, the seed can be buried outdoors on the north side of a building. Small quantities of seed that are commonly handled by home gardeners can be placed in a refrigerator.

The length of the stratification period varies with seed of different species. The recommendation made for each species is only an average and not an exact, standard period of time.

For the seed of some species, fall planting is a satisfactory substitute for stratification and saves time, labor and space in cold storage. For these species, fall planting is effective if the seeds remain moist and are well protected from rodents, and the temperature in the winter stays low for a sufficient length of time.

Nuts

Hickories (*Carya* spp.) The seeds of most hickories are dormant, requiring stratification for various periods of time. Stratification requirements depend on the species and, to some extent, on the origin of the seed. Seeds should be collected in the fall and the shucks removed. Prior to stratification, seeds should be soaked in water for two days to four days. Water should be changed once or twice per day to eliminate tannins. The approximate stratification requirement of nuts of the most common Oklahoma hickories is three months at 33 F to 50 F. Fall planting of hickory nuts is used very successfully, provided the nuts are well protected against rodents and severe freeze.

Pecans (*C. illinoensis*) Pecans differ from other hickory nuts in its characteristics and requirements. It does not fall into dormancy, but can germinate at any time when conditions are favorable. Despite this difference, pecan seed is commonly stratified or kept in cold storage at high humidity through the winter and planted in the spring. This prevents the nut from becoming rancid and from losing its viability. And at the same time, the possibility of the pecan germinating out of season is excluded. Stratified pecans reduce the time to germination, provide more uniform germination and produce more vigorous seedlings. Good quality nuts should be collected in the fall. Sort out any cracked or insect-damaged nuts. Soak pecans in water overnight before stratifying in moist vermiculite. Two months at 36 F to 40 F is needed, but pecans can be held at these temperatures for five months to six months. If planted during the fall and winter, the non-dormant pecan will usually

germinate the following spring. Pecan trees grown from seed will need to be grafted to a desired variety. Growing seedlings for rootstocks is common where cold-hardy pecan rootstocks are needed. Fact Sheet HLA-6207 "Starting Pecan Trees" explains the process from harvest to planting.

Black Walnuts (*Juglans nigra*) Black walnut, when ripened and shed from the tree, is dormant. The seed coat, though extremely hard, permits the kernel to absorb water rather freely. By the time the kernel after-ripens and is ready to resume growth, the hard seed coat cracks along the edges and, thus, presents no obstacle to the growing embryo. Walnuts should be collected in the fall and husks removed. Place the walnuts in water. Those that float are not viable and should be discarded; use only the nuts that sink to the bottom. Walnuts can be planted in the fall or stratified and planted in the spring. Black walnut seed after-ripens in stratification at 33 F to 50 F in three months.

Small Fruit

Blackberries (*Rubus* spp.) Blackberry seed, due to the dormancy of its embryo, requires stratification at 33 F to 35 F before being planted. The stratification requirement varies considerably with as long as five months to six months being necessary. The average is approximately three months. September is suggested as the best time for planting.

Treat dry seed with acid for about 30 minutes. Commercial varieties of blackberries are commonly propagated by root cuttings or tip layering. Fact Sheet HLA-6443 "Layering Propagation for the Home Gardener" details the layering process.

Grapes (*Vitis* spp.) Grape seed requires stratification at 37 F, varying in length from 90 days to 140 days.

Because of the great variation of grape seedlings, seed cannot be relied upon to produce a vineyard of the desired variety. Commercial varieties of grapes are propagated by growing cuttings for own rooted plants or by grafting or budding varieties to rootstock plants.

Tree Fruits

Apple (*Malus* spp.) Apple seeds are primarily used for the production of rootstocks, since apple varieties do not come true from seed. The seedlings will require budding or grafting to a desirable variety. The seed of apples is dormant and requires stratification. Seed should be removed after the fruit ripen. Seed can be sown in the fall or stratified at 34 F to 40 F for 60 days to 90 days. From the time of its extraction from the fruit, the seed should be kept continuously moist. Excessively prolonged drying results in the loss of seed viability.

Cherry (*Prunus* spp.) Cherries will not reproduce true to seed and will need budding or grafting to a desired cultivar. The seeds of all common species of cherries have a period of dormancy. Various species and varieties of cherry differ somewhat in their stratification requirements, some complete after-ripening in a course of four weeks, while others require as long as 14 weeks or more with the same conditions. The after-ripening seeds germinate, and the seedlings grow freely at a temperature close to freezing. Therefore, a long period of stratification cannot be recommended. Sour cherry (*Prunus cerasus*) requires 90 days to 150 days at temperatures from 33 F to 41 F.

While in stratification, cherry seed must be observed frequently, particularly during the last part of the recommended stratification period. If the completion of after-ripening occurs too far in advance of the time of planting (as evidenced by cracking of the seed coat), the temperature of stratification should be lowered to 31 F to 32 F for the rest of the stratification period.

Plum (*Prunus* spp.) Plum seed requires stratification. The exact period for plums varies with the species as well as with individual lots. The common wild plum of Oklahoma or sand plum (*Prunus angustifolia*) is usually well after-ripened after stratification of 60 days to 90 days at 34 F to 40 F. Seeds from the previous year's crop can be used to start new sand plum seedlings, provided that the seeds have not been boiled or frozen. Because sand plums are generally cross pollinated, any new seedling will likely be different from the original parent plant. Fact Sheet HLA-6258 "Sand Plums for Home and Commercial Production" details the process of propagating this native Oklahoma plant.

Peach (*Prunus persica*) & Apricot (*Prunus armeniaca*) At the time of ripening, as much as 50 percent of the seed may be dormant. In commercial nursery practice, peach pits are commonly planted in the fall to produce rootstock seedlings. They usually germinate freely the following spring because fall planting provides the proper conditioning. However, one can expect somewhat better results if the seeds are stratified during winter under controlled conditions and planted in the spring. The most favorable stratification temperature for the peach is between 32 F and 45 F. At this temperature, the seed after-ripens in approximately 100 days. Rootstocks will require budding to a desired variety.

Persimmon (*Diospyros virginiana*) Propagation of persimmon is considered difficult and germination of its seed is uncertain. The seed is dormant when ripe, this is caused by embryo dormancy. Stratification at a low temperature for a period of 20 days to 40 days, or fall planting of unstratified seed has been reported effective in breaking dormancy and forcing germination.

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